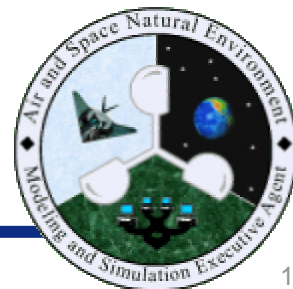




DoD Modeling & Simulation Executive Agent for the Air & Space Natural Environment



BGen David L. Johnson, USAF
Director, Air Force Weather



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REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
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1. REPORT DATE (DD-MM-YYYY) 01-06-2002		2. REPORT TYPE Briefing		3. DATES COVERED (FROM - TO) xx-xx-2002 to xx-xx-2002	
4. TITLE AND SUBTITLE DoD Modeling & Simulation Executive Agent for the Air & Space Natural Environment Unclassified				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Johnson, David L. ;				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME AND ADDRESS USAF XXXXX, XXXXXXX				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME AND ADDRESS United States Department of Defense Defense Modeling and Simulation Office 1901 N. Beauregard St., Suite 500 Alexandria, VA22311-1705				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT APUBLIC RELEASE					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT Vision: Establish capabilities & infrastructure for DoD M&S programs to obtain authoritative representations of the natural environment that are readily accessible and cost effective Develop physically consistent representations within and among the Air, Ocean, Space, and Terrain domains Deliver the environment when needed in a standardized format that promotes interoperability, re-use, and confidence (includes ?Just-in-Time? production)					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:		17. LIMITATION OF ABSTRACT Public Release	18. NUMBER OF PAGES 21	19. NAME OF RESPONSIBLE PERSON Fenster, Lynn lfenster@dtic.mil	
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified		19b. TELEPHONE NUMBER International Area Code Area Code Telephone Number 703767-9007 DSN 427-9007	
				Standard Form 298 (Rev. 8-98) Prescribed by ANSI Std Z39.18	



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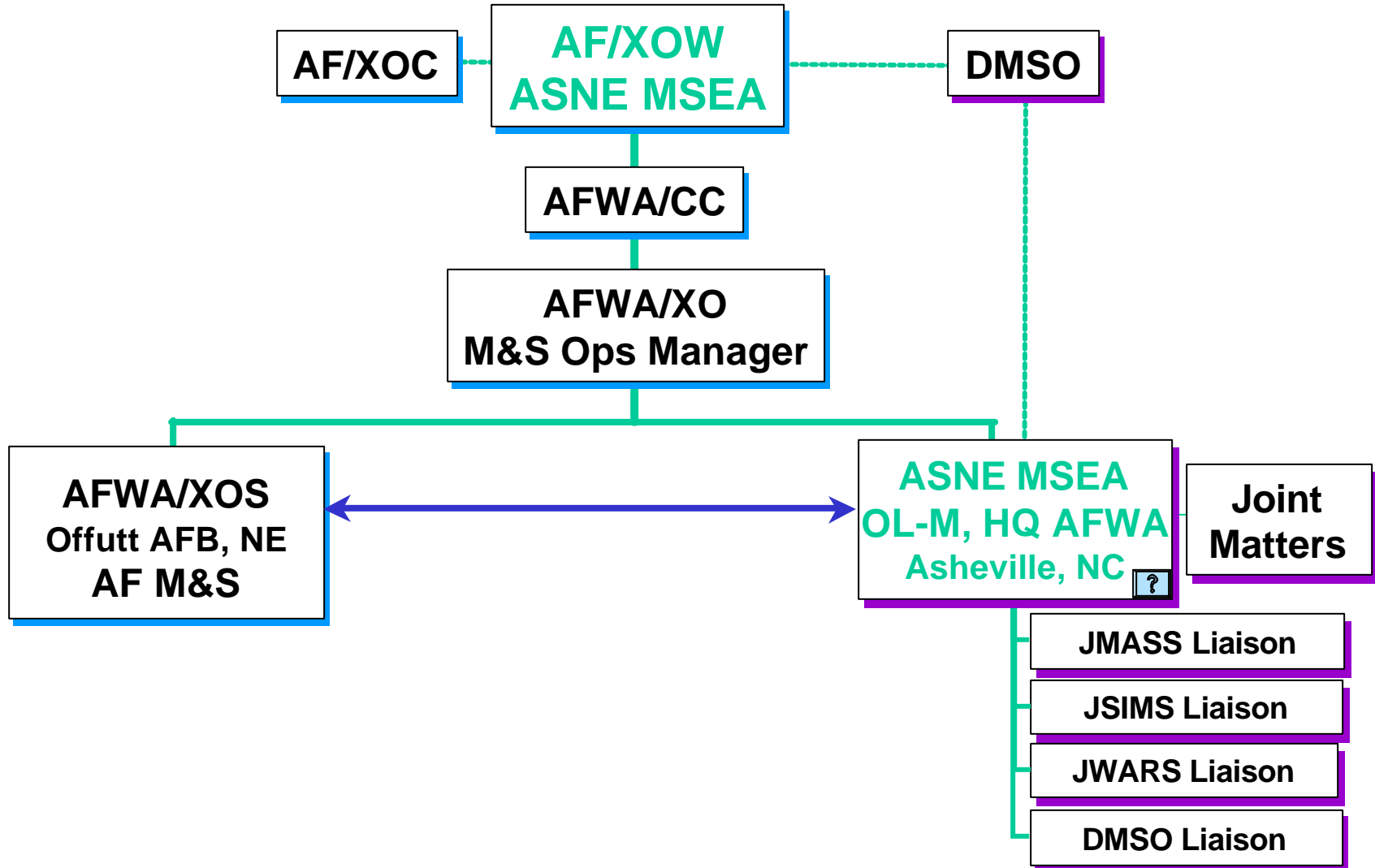
MSEA ORIGIN

- **DoD Modeling and Simulation (M&S) Management DoD Directive 5000.59 (Jan 94)**
 - Recommended designation of DoD Modeling & Simulation Executive Agents (MSEAs) with DoD-wide responsibilities
 - Defense Modeling and Simulation Office is DoD focal point for implementing the DoD M&S Master Plan, DoD 5000.59-P (Oct 95)
- **USD (AT&L) Memoranda**
 - **Air Force designated MSEA for Air & Space (9 Apr 96)**
 - Navy designated MSEA for Ocean (9 Apr 96)
 - National Imagery and Mapping Agency (NIMA) designated MSEA for Terrain (5 Apr 95)



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ASNE MSEA ORGANIZATION





INTEGRATED NATURAL ENVIRONMENT

■ Vision:

- Establish capabilities & infrastructure for DoD M&S programs to obtain authoritative representations of the natural environment that are readily accessible and cost effective
- Develop physically consistent representations within and among the Air, Ocean, Space, and Terrain domains
- Deliver the environment when needed in a standardized format that promotes interoperability, re-use, and confidence (includes “Just-in-Time” production)

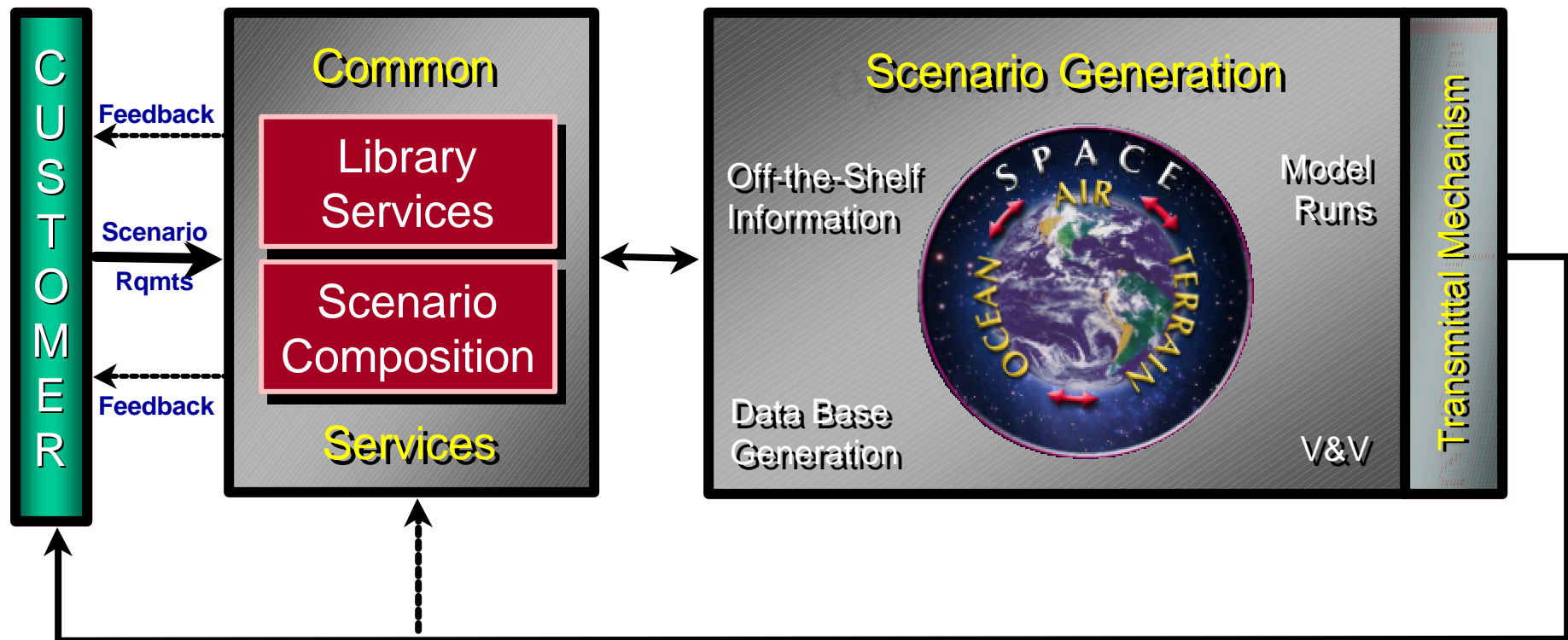


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DMSO Integrated Natural Environment Strategy

The Challenge

Create a physically consistent, cross-domain, authoritative “ground truth” of the natural environment that meets user requirements



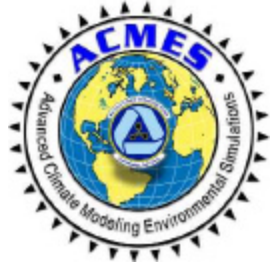
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ASNE MSEA IMPLEMENTATION

- Establish capabilities & infrastructure for DoD M&S
 - Designated the Air Force Combat Climatology Center as the Air Force production center for M&S environmental data
 - **Fielded Advanced Climate Modeling and Environmental Simulation (ACMES) to generate required atmospheric data**
 - Host data and conduct intelligent search (mine) with the Environmental Scenario Generator (ESG) by end of CY01
 - Expand capabilities to meet JWARS, JSIMS, and JMASS parameter requirements by end of CY01
 - Field online capability to view weather impacts on weapons systems -- Warfighter Weather Effects (WxFX)
 - Develop Coupled Land-Atmospheric Terrestrial Weather model
 - Fund development of space weather environment models
 - Field capability to perform weapon effectiveness calculations supporting simulations running at 1000 times real time (CSSMStats)

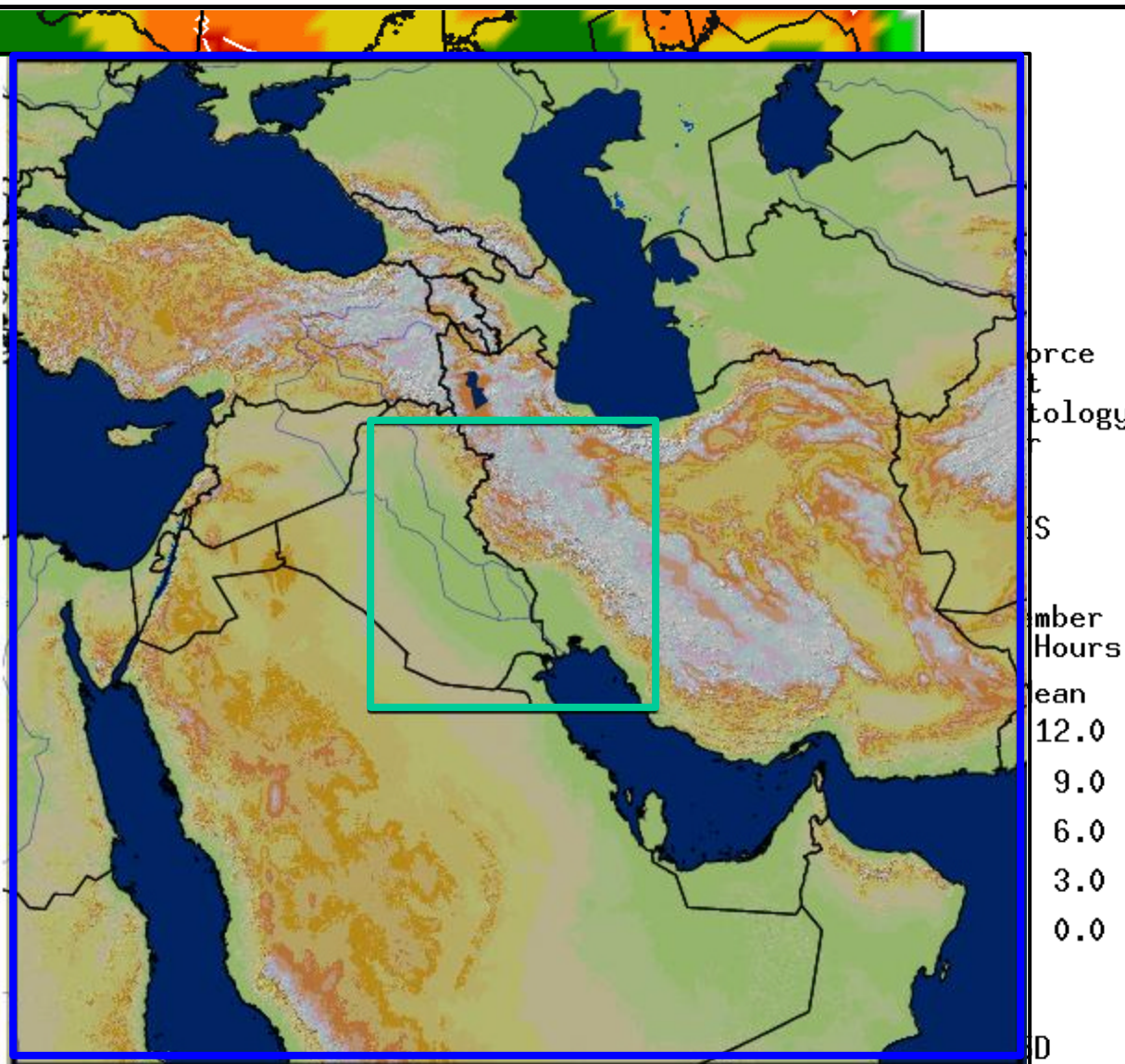


Advanced Climate Modeling & Environmental Simulations (ACMES)

ACMES
for data

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Terrain Data
Used for SW Asia



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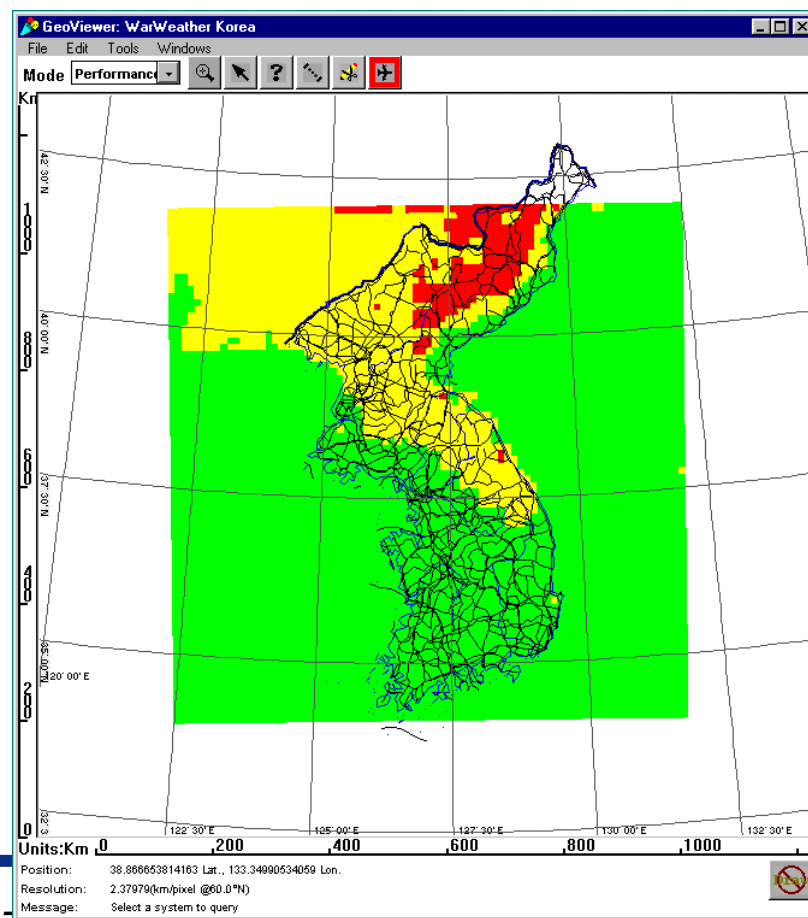
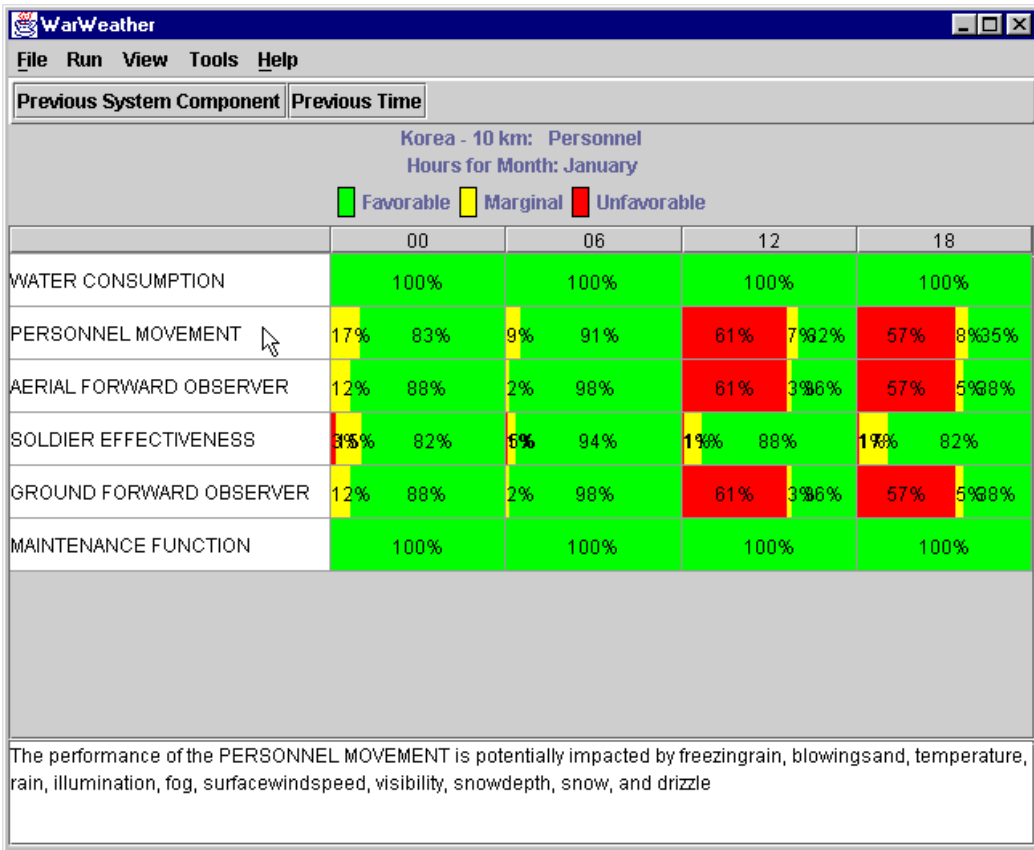
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Warfighter Weather Effects (WxFX)

WxFX will deliver high resolution weather effects/impacts products to the warfighter for mission rehearsal and long-range planning.



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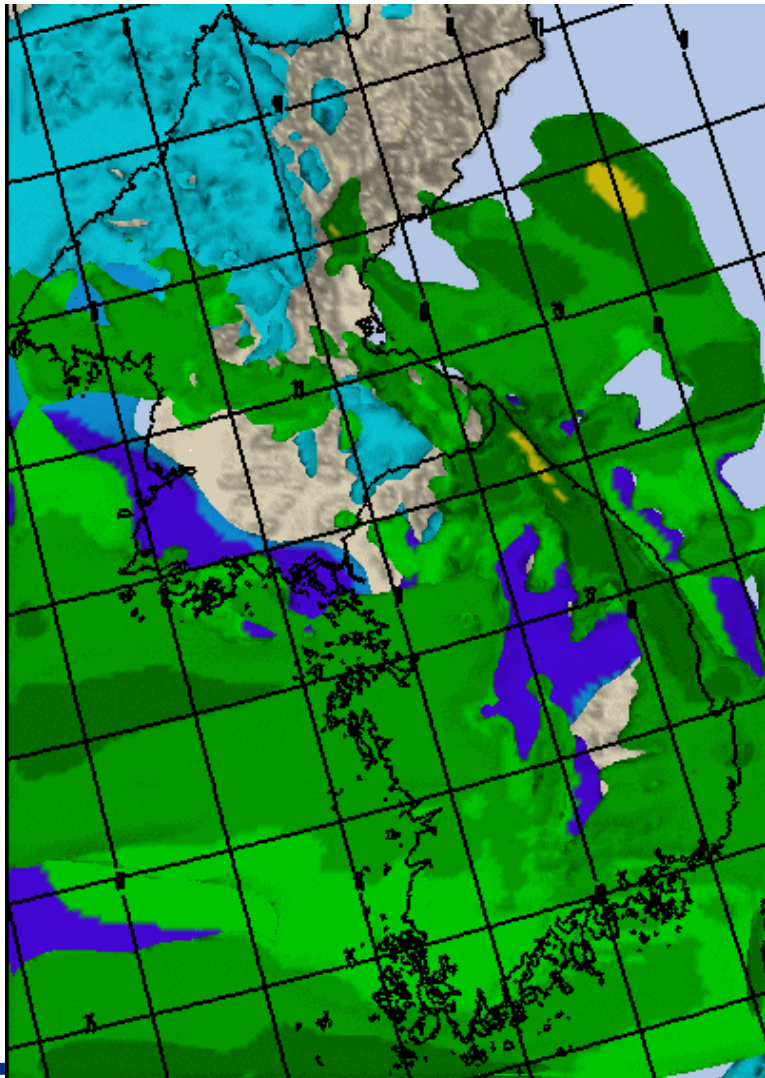
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High Resolution Atmospheric Model (MM 5)



Cloud Tops (MSL)

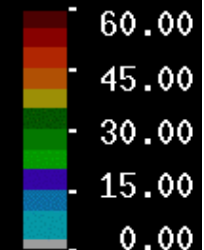
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Saturday
0600Z
24hr FCST

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Air Force
Weather
Agency

MM5 5.0Km
Model Time
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17 Feb 01
0600Z



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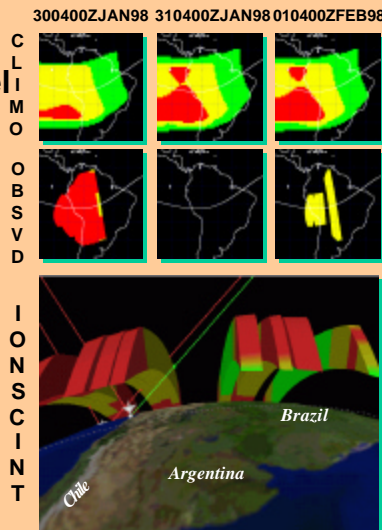
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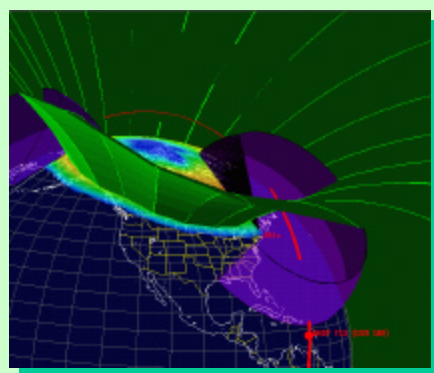
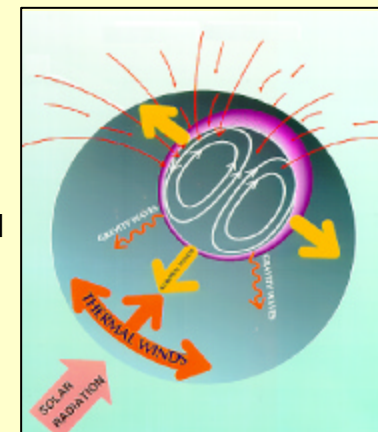
SPACE WEATHER

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- **Ionospheric Scintillation:** Model ionospheric disturbances that cause rapid phase and amplitude fluctuations of satellite signals and degrade or disrupt satellite-based nav and comm systems.



- **Neutral Density:** Simulate changes in mesosphere and thermosphere neutral density, temperature, and winds so changes in the satellite-drag environment can be determined easily.

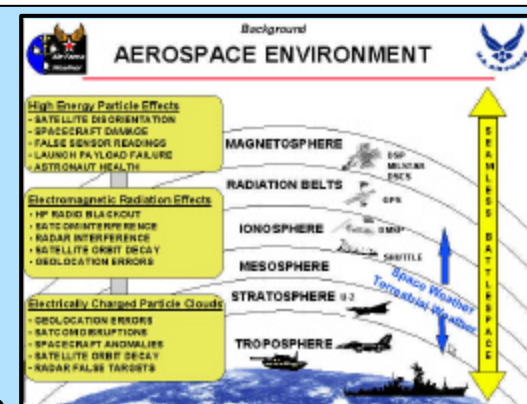


lution and satellite drag instead of using climatology.

- **GEOspace:** Incorporate IonScint and NeutDens models and effects on space- and ground-based systems. Will provide dynamic scenarios to simulate impacts of Scintillation and satellite drag instead of using climatology.

- **Space Wx Historical Archive:**

Create a consistent, integrated historical record of the near-Earth space environment of three solar cycles (weak, moderate, strong).



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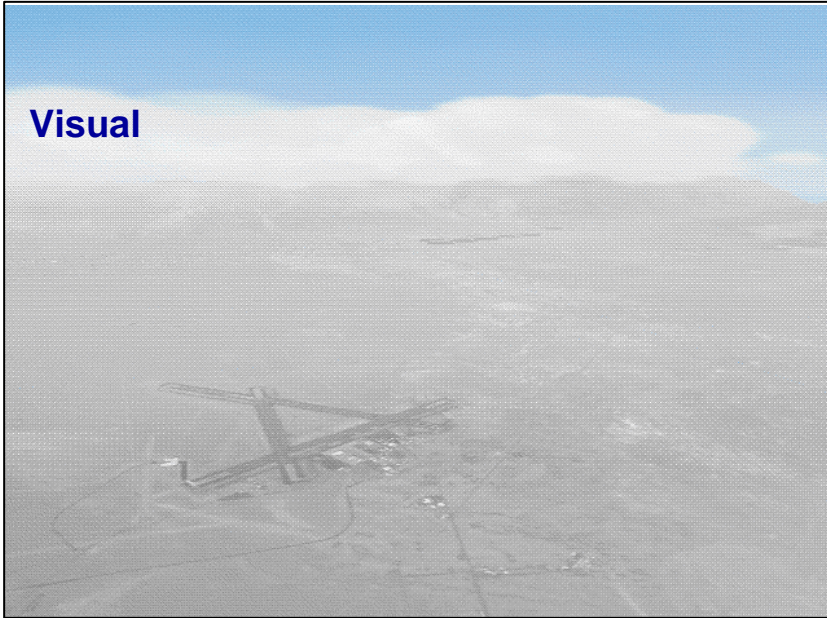
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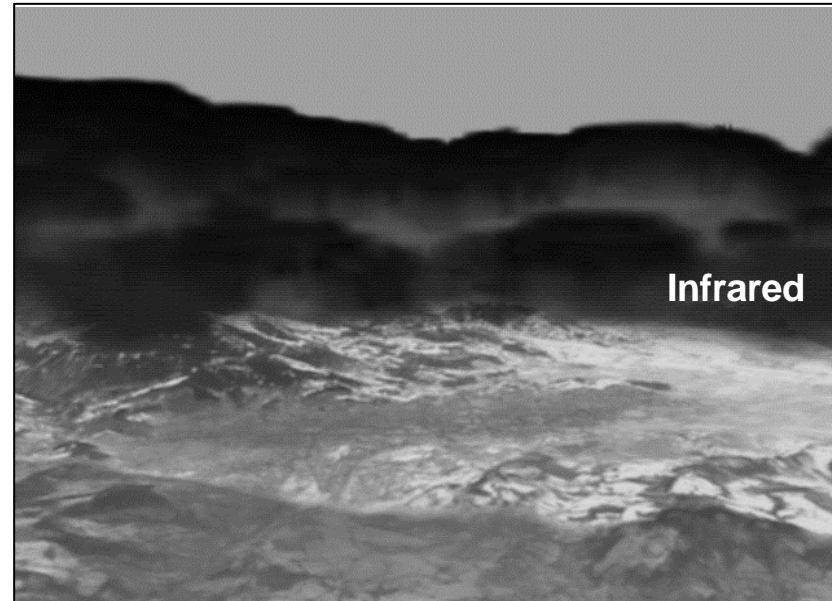
Cloud Scene Simulation Model Statistics (CSSMStats)

Visual



- Develop cloud scene inputs for simulations that run 25 - 1000 times faster than real time
- CSSMStats delivers probability curves enabling rapid, on-the-fly “calculations” for target acquisition

Infrared



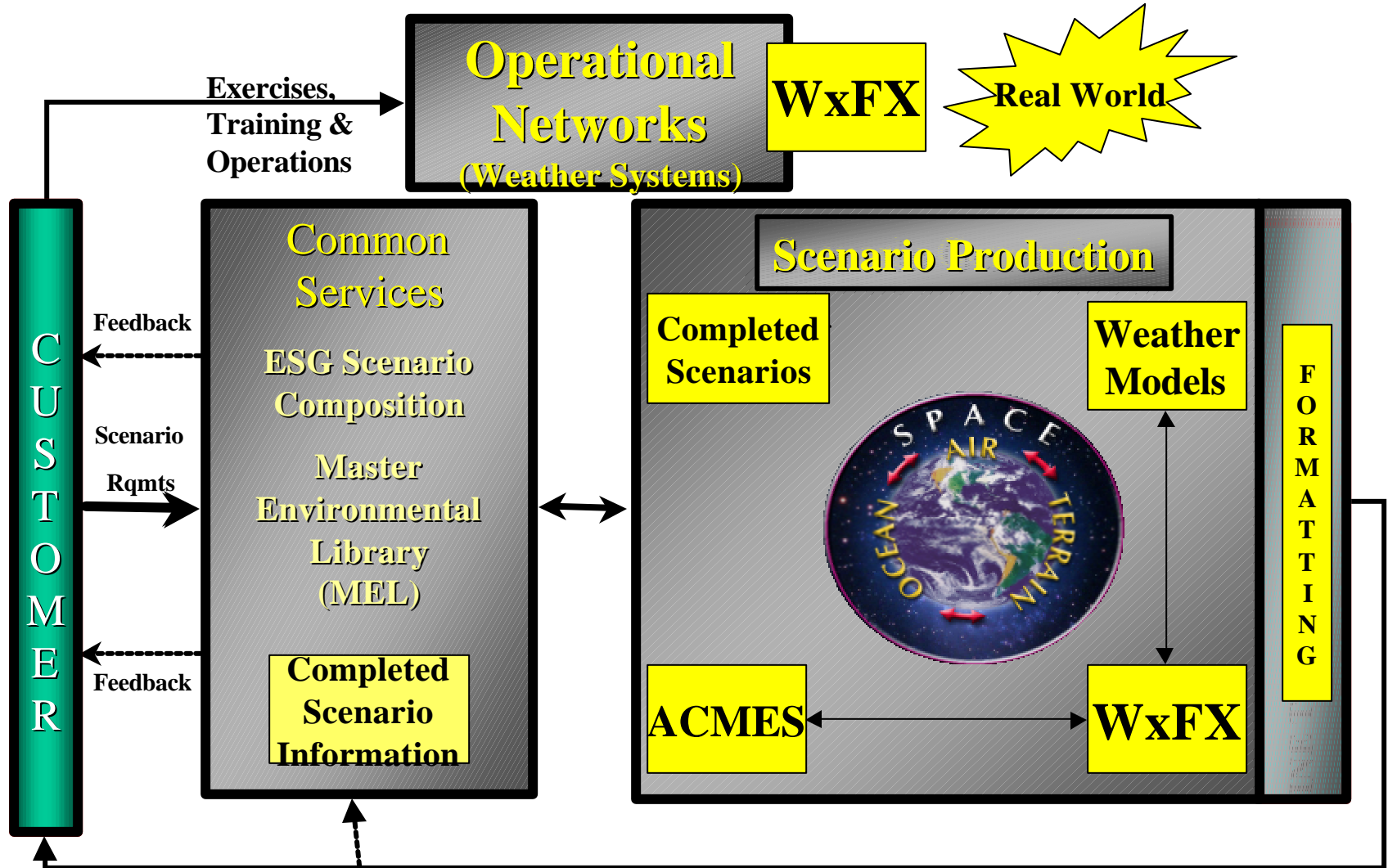
- Conducted numerous computer runs for a variety of air/space platforms using a variety of targets
- Created probability tables using statistical results of weapon systems' MOEs





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ASNE NEAR TERM OPPORTUNITIES -- FUNCTIONAL VIEW



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THE WAY AHEAD

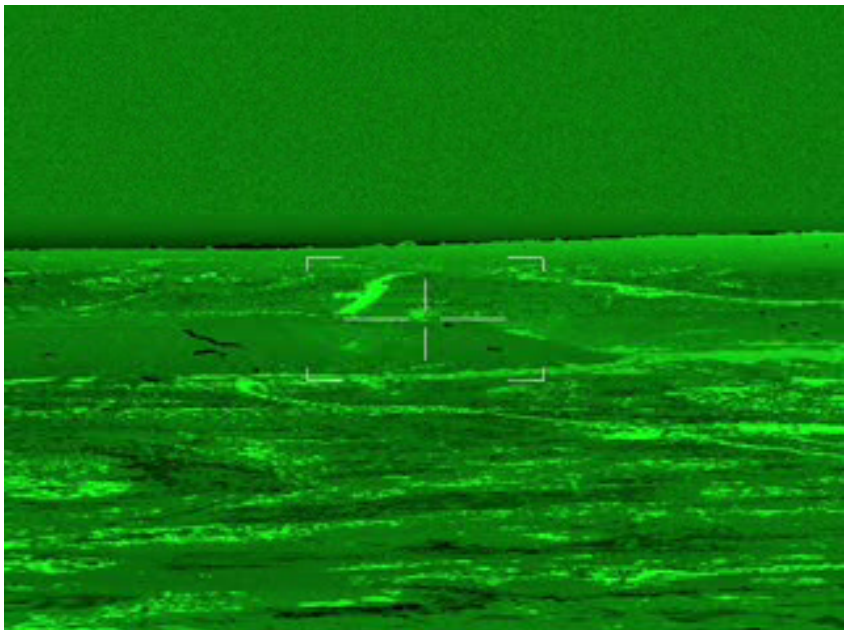
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- **Continue Air and Space M&S efforts**
- **Physically consistent representation both within and among the Air, Ocean, Space, and Terrain domains**
 - **Integrate Ocean and Terrain segments of the authoritative representation with Atmosphere**
 - **Use ACMES to initialize Ocean models**
 - **With development of dynamic terrain technology, atmospheric influences reflected in terrain**
- **Deliver in a standard format that promotes interoperability, re-use, and confidence**
 - **Migrate to SEDRIS Transmittal Format to meet customer needs**
 - **Exploit existing post-processing software to meet operational needs**
- **Next Battlefield**



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Modeling & Simulation Executive Agent for the Air & Space Natural Environment



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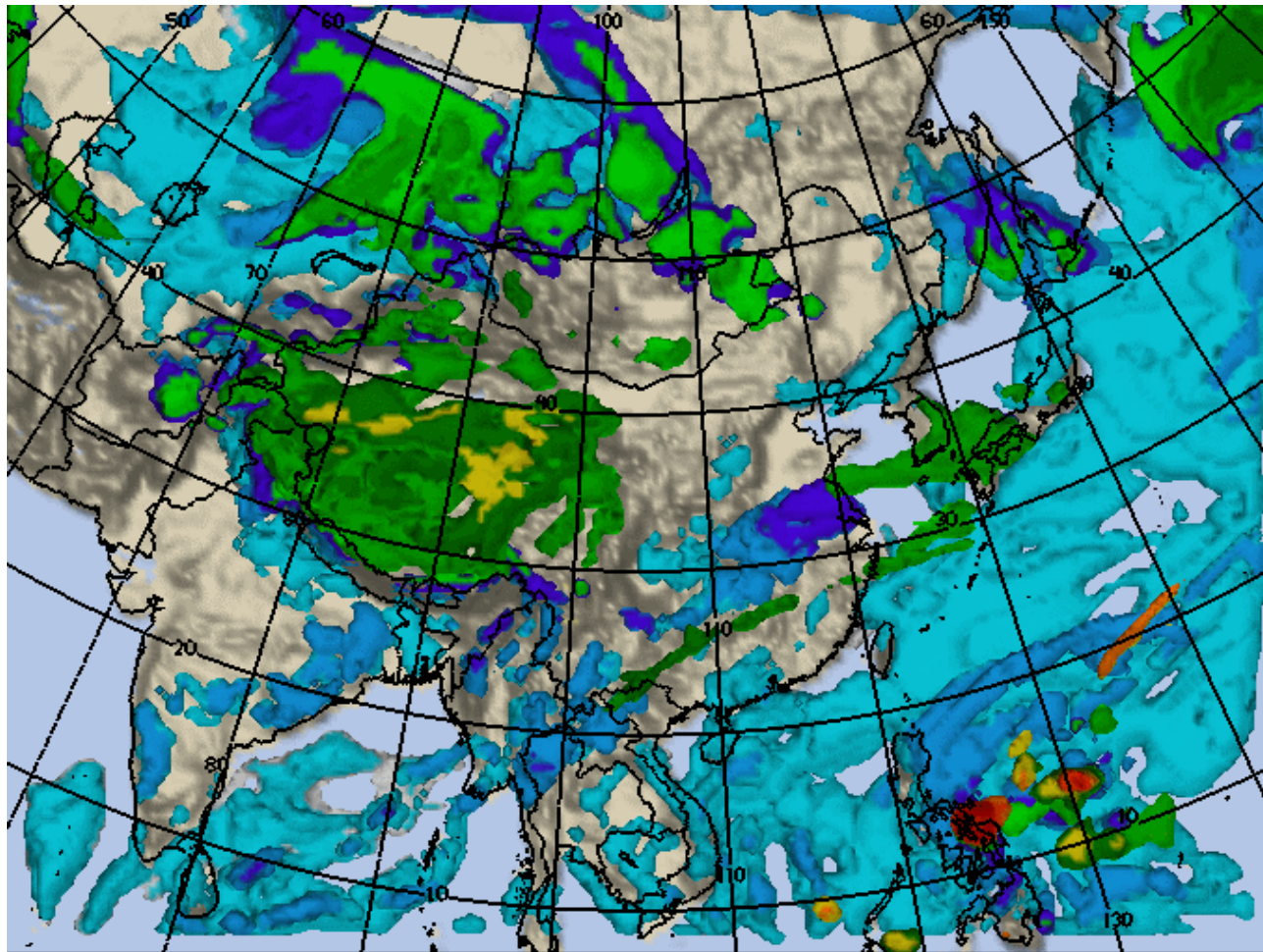
Web site: <http://msea.afccc.af.mil>

Backup Slides



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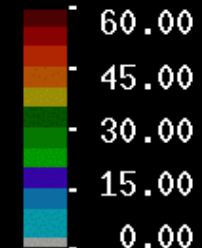
17 Feb 01
Saturday
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Vis5D

Air Force
Weather
Agency

MM5 45.0Km
Model Time
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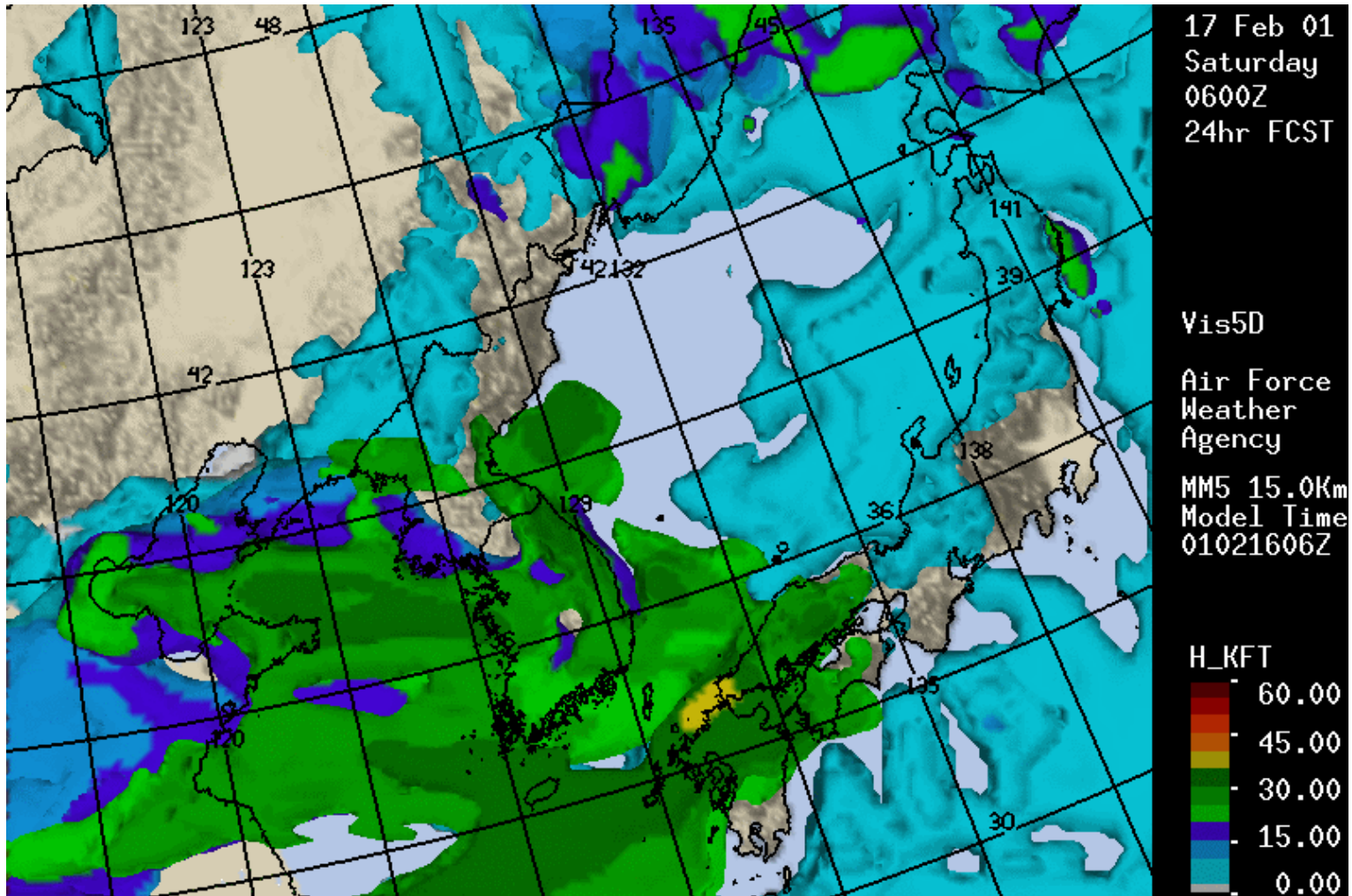
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Cloud Tops (MSL)



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High Resolution Atmospheric Model (MM 5)



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